

IN THE CLAIMS:

Please amend claims 1, 12, 15, 16, 18-21, 24, 27, 29, 32-34, 37, and 39-41 as follows:

1. (Currently amended) An audio user-interfacing method in which items are represented in an audio field by corresponding synthesized sound sources from where sounds related to the items appear to emanate, the method ~~including the steps of~~ comprising:

(a) associating ~~at least~~ only some of the sound sources into a collection of which they are members; and

(b) changing the collection in either direction between:

B  
[[ - ]] an un-collapsed state in which the member sound sources are individually present un-muted in the audio field;

[[ - ]] a collapsed state in which the member sound sources are muted and a collection-representing sound source provides an audible presence for the collection in the audio field;

[[ - ]] ~~an un-collapsed state in which the member sound sources are individually present un-muted in the audio field;~~

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[[ - ]] ~~a collapsed state in which the member sound sources are muted and a collection-representing sound source provides an audible presence for the collection in the audio field; and~~

sound sources that are un-related to said collection remaining present in the audio field independently of the collection state.

2. (Original) A method according to claim 1, wherein the collection changes state, at least in one direction, in response to user command.

3. (Original) A method according to claim 1, wherein the collection changes state, at least in one direction, automatically upon detection of predetermined trigger conditions.

4. (Original) A method according to claim 1, wherein the collection-representing sound source remains present in the audio field when the collection is in its un-collapsed state.

5. (Original) A method according to claim 1, wherein the collection-representing sound source is muted when the collection is in its un-collapsed state.

6. (Original) A method according to claim 1, wherein the change between collection states, at least in one direction, is accompanied by a corresponding sound suggestive of moving to the end state of the current change.

7. (Original) A method according to claim 1, wherein the change between collection states, at least in one direction, is accompanied by moving the member sound sources through the audio field between their normal locations and the location of the

collection-representing sound source, the direction of this movement being dependent on the end state of the current change.

8. (Original) A method according to claim 1, wherein when the collection is in its collapsed state, the collection-representing sound source provides an audio label for the collection, this label being repeated at intervals.

B 9. (Original) A method according to claim 1, wherein when the collection is in its collapsed state, the collection-representing sound source outputs at least extracts of the sounds associated with the collection member sound sources when un-collapsed.

10. (Original) A method according to claim 1, wherein when the collection is in its collapsed state, the collection-representing sound source is used to provide audio notifications of events related to the items represented by the member sound sources.

- 11. (Original) A method according to claim 1, wherein at least some of the said items represented by the sound sources are audio labels for services, the method further involving selecting a service by selecting the corresponding audio-label sound source.

12. (Currently amended) A method according to claim 1, wherein the collection is associated with a respective audio-field reference relative to which the member sound sources of the collection are

positioned, other sound sources ~~if any~~, in the audio field being positioned relative to one or more further audio-field references, the audio-field references being independently movable relative to a presentation reference determined by a mounting configuration of audio output devices used to synthesise said sound sources, with movement of a said audio-field reference relative to the presentation reference resulting in corresponding movement of the associated sound sources.

13. (Original) A method according to claim 12, wherein the audio field reference associated with the collection is world-stabilised and the member sound sources represent augmented reality services, each member sound source being positioned relative to the audio field reference of the collection such that for a user located in a notional reference position, the sound source lies in the same direction as a corresponding real-world location associated with the augmented reality service represented by the sound source.

14. (Original) A method according to claim 1, wherein the audio field is rendered by apparatus including audio output devices according to sound-source data indicative of the rendering position and audibility of the each sound source in the audio field, the muting and un-muting of said member sound sources to collapse and un-collapse the collection being effected by changing the sound-

source data for these sound sources to appropriately set the audibility of the sources.

15. (Currently amended) A method according to claim 1, wherein upon un-collapsing of the collection, at least some of the other sound sources, ~~if any,~~ in the audio field have their ~~presentation~~ positions in the audio field adjusted.

16. (Currently amended) Apparatus for providing an audio user interface in which items are represented in an audio field by corresponding synthesized sound sources from where sounds related to the items appear to emanate, the apparatus comprising:

[[ - ]]storage means for storing data on the sound sources, this data including audibility data for controlling the audibility of the sources in the audio field, and collection data for associating ~~at least~~ only some of the sound sources into a collection of which those sound sources are members and for further associating with the collection a collection-representing sound source;

[[ - ]]rendering-position determining means for determining, for each of said sound ~~sources~~ sources, a respective [[ n ]] associated rendering position at which the sound source is to be synthesized to sound in the audio field;

[[ - ]]collection-control means for changing the collection in either direction between un-collapsed and collapsed states and for

correspondingly setting the audibility data of the ~~associated~~  
collection-related sound sources such that:

[[~~-~~]]in the un-collapsed state of the collection, the member sound sources are audible at their respective rendering positions;

[[~~-~~]]in the collapsed state of the collection, the member sound sources are muted and the collection-representing sound source provides an audible presence for the collection in the audio field.;  
and

[[~~-~~]]rendering means, including audio output devices, for generating an audio field in which said sound sources are synthesized at their associated rendering positions and with the audibility of the collection-related sound sources ~~as~~ set by said collection-control means, the rendering means being arranged to present in said audio field, independently of the current state of said collection, those sound sources that are unrelated to said collection.

17. (Original) Apparatus according to claim 16, wherein the collection-control means includes user input means for changing the collection state, at least in one direction.

18. (Currently amended) Apparatus according to claim 16, wherein the collection-control means is ~~operative~~ arranged to

automatically change the state of the collection, at least in one direction, upon detection of predetermined trigger conditions.

19. (Currently amended) Apparatus according to claim 16, wherein the collection-control means is ~~operative~~ arranged to set the audibility data of the collection-representing sound source such that this source remains present in the audio field when the collection is in its un-collapsed state.

20. (Currently amended) Apparatus according to claim 16, wherein the collection-control means is ~~operative~~ arranged to set the audibility data of the collection-representing sound source such that this source is muted in the audio field when the collection is in its un-collapsed state.

21. (Currently amended) Apparatus according to claim 16, wherein the collection-control means is ~~operative~~ arranged in changing between collection states, at least in one direction, to modify the rendering positions of the member sound sources such they move through the audio field between their normal positions and the positions of the collection-representing sound source, the direction of this movement being dependent on the end state of the current change.

22. (Original) Apparatus according to claim 16, wherein when the collection is in its collapsed state, the collection-representing sound source provides an audio label for the collection, this label being repeated at intervals.

23. (Original) A method according to claim 16, wherein when the collection is in its collapsed state, the collection-representing sound source outputs at least extracts of the sounds associated with the collection member sound sources when un-collapsed.

24. (Currently amended) Apparatus according to claim 16, further comprising notification means ~~operative~~ arranged when the collection is in its collapsed state, to provide via the collection-representing sound source, audio notifications of events related to the items represented by the member sound sources.

25. (Original) Apparatus according to claim 16, wherein at least some of the said items represented by the sound sources are audio labels for services, the apparatus including a selection arrangement for enabling a user to select a service by selecting the corresponding audio-label sound source.

26. (Original) Apparatus according to claim 16, wherein the rendering-position determining means comprises:



[[ - ]] means for setting the location of each said collection member sound source relative to an audio-field reference;

[[ - ]] means for controlling an offset between the audio field reference and a presentation reference, the presentation reference being determined by a mounting configuration of the audio output devices; and

[[ - ]] means for deriving the rendering position of each sound source based on the location of the sound source in the audio field and said offset.

27. (Currently amended) Apparatus according to claim 26, wherein the collection member sound sources represent augmented reality services that have associated real-world locations, the rendering-position determining means being ~~operative~~ arranged to world-stabilise the audio field reference associated with the collection and to position each member sound source relative to the audio field reference such that for a user located in a notional reference position, the sound source lies in the same direction as the corresponding said real-world location.

28. (Original) Apparatus according to claim 26, wherein the said means for setting an offset between the audio field reference and a presentation reference, comprises user input means for enabling a user to change said offset, and stabilisation means for

varying the said offset such as to stabilise the audio field reference relative to one of:

[[ - ]] a user's head;

[[ - ]] a user's body;

[[ - ]] a vehicle mounting the apparatus;

[[ - ]] the world.

29. (Currently amended) Apparatus for providing an audio user interface in which items are represented in an audio field by corresponding synthesized sound sources from where sounds related to the items appear to emanate, the apparatus comprising:

[[ - ]] a data store for storing data on the sound sources, this data including audibility data for controlling the audibility of the sources in the audio field, and collection data for associating ~~at least~~ only some of the sound sources into a collection of which those sound sources are members and for further associating with the collection a collection-representing sound source;

[[ - ]] a rendering-position determining arrangement ~~operative~~ arranged to determine, for each of said sound ~~sources~~ sources, a respective [[n]] associated rendering position at which the sound source is to be synthesized to sound in the audio field;

[[ - ]] a collection-control arrangement ~~operative~~ arranged to change the collection in either direction between un-collapsed and

collapsed states and to correspondingly set the audibility data of the ~~associated~~ collection-related sound sources such that:

[[~~-~~]]in the un-collapsed state of the collection, the member sound sources are audible at their respective rendering positions;

[[~~-~~]]in the collapsed state of the collection, the member sound sources are muted and the collection-representing sound source provides an audible presence for the collection in the audio field.;  
and

[[~~-~~]]a rendering subsystem, including audio output devices, arranged to generate an audio field in which said sound sources are synthesized at their associated rendering positions ~~and~~ with the audibility of the collection-related sound sources ~~as~~ set by said collection-control ~~means~~ arrangement, the rendering arrangement being arranged to present in said audio field, independently of the current state of said collection, any said sound sources that are unrelated to said collection.

30. (Original) Apparatus according to claim 29, wherein the collection-control arrangement includes a user input arrangement for changing the collection state, at least in one direction.

31. (Currently amended) Apparatus according to claim 29, wherein the collection-control arrangement is ~~operative~~ arranged to

automatically change the state of the collection, at least in one direction, upon detection of predetermined trigger conditions.

32. (Currently amended) Apparatus according to claim 29, wherein the collection-control arrangement is ~~operative~~ arranged to set the audibility data of the collection-representing sound source such that this source remains present in the audio field when the collection is in its un-collapsed state.

33. (Currently amended) Apparatus according to claim 29, wherein the collection-control arrangement is ~~operative~~ arranged to set the audibility data of the collection-representing sound source such that this source is muted in the audio field when the collection is in its un-collapsed state.

34. (Currently amended) Apparatus according to claim 29, wherein the collection-control arrangement is ~~operative~~ arranged in changing between collection states, at least in one direction, to modify the rendering positions of the member sound sources such they move through the audio field between their normal positions and the positions of the collection-representing sound source, the direction of this movement being dependent on the end state of the current change.

35. (Original) Apparatus according to claim 29, wherein when the collection is in its collapsed state, the collection-representing sound source provides an audio label for the collection, this label being repeated at intervals.

36. (Original) A method according to claim 29, wherein when the collection is in its collapsed state, the collection-representing sound source outputs at least extracts of the sounds associated with the collection member sound sources when un-collapsed.

37. (Currently amended) Apparatus according to claim 29, further comprising a notification arrangement ~~operative~~ arranged when the collection is in its collapsed state, to provide via the collection-representing sound source, audio notifications of events related to the items represented by the member sound sources.

38. (Original) Apparatus according to claim 29, wherein at least some of the said items represented by the sound sources are audio labels for services, the apparatus including a selection arrangement for enabling a user to select a service by selecting the corresponding audio-label sound source.

39. (Currently amended) Apparatus according to claim 29, wherein the rendering-position determining arrangement comprises:

[[~~-~~]]a setting arrangement for setting the location of each said collection member sound source relative to an audio-field reference;

[[~~-~~]]a control arrangement for controlling an offset between the audio field reference and a presentation reference, the presentation reference being determined by a mounting configuration of the audio output devices; and

[[~~-~~]]a deriving arrangement ~~operative~~ arranged to derive the rendering position of each sound source based on the location of the sound source in the audio field and said offset.

40. (Currently amended) Apparatus according to claim 39, wherein the collection member sound sources represent augmented reality services that have associated real-world locations, the rendering-position determining arrangement being ~~operative~~ arranged to world-stabilise the audio field reference associated with the collection and to position each member sound source relative to the audio field reference such that for a user located in a notional reference position, the sound source lies in the same direction as the corresponding said real-world location.

41. (Currently amended) Apparatus according to claim 39, wherein the said setting arrangement comprises a user input arrangement ~~operative~~ arranged to enable a user to change said

offset, and a stabilisation arrangement ~~operative~~ arranged to vary the said offset such as to stabilise the audio field reference relative to one of:

8 [[-]]a user's head;

[[ -]]a user's body;

[[ -]]a vehicle mounting the apparatus;

[[ -]]the world.

42. (New) Apparatus for driving an audio output device via an audio user interface in which items are represented in an audio field by corresponding synthesized sound sources from which sounds related to the items appear to emanate, the apparatus comprising:

8 a data store for storing data on the sound sources, the stored data including audibility data for controlling the audibility of the sources in the audio field, and collection data for associating only some of the sound sources into a collection of which those sound sources are members and for further associating with the collection a collection-representing sound source;

a processor arrangement for:

(a) determining for each of said sound sources a respective associated rendering position at which the sound source is to be synthesized to sound in the audio field;

(b) changing the collection in either direction between un-collapsed and collapsed states and to correspondingly set the audibility data of the collection-related sound sources such that:

in the un-collapsed state of the collection, the member sound sources are audible at their respective rendering positions;

in the collapsed state of the collection, the member sound sources are muted and the collection-representing sound source provides an audible presence for the collection in the audio field.;

and



(c) generating signals for causing an audio field in which said sound sources are synthesized at their associated rendering positions with the audibility of the changed collection-related sound sources, the signals being such that said audio field is presented independently of the current state of said collection, any said sound sources that are unrelated to said collection.

43. (New) The apparatus of claim 42 in combination with audio output devices connected to be driven by the signals.

44. (New) Apparatus for an driving audio output device via an audio user interface in which items are represented in an audio field by corresponding synthesized sound sources from which sounds related to the items appear to emanate, the apparatus comprising:

a data store for storing data on the sound sources, the stored data including audibility data for controlling the audibility of the sources in the audio field, and collection data for associating only some of the sound sources into a collection of which those sound sources are members and for further associating with the collection a collection-representing sound source;

a processor arrangement for:

changing the collection in either direction between:

an un-collapsed state in which the member sound sources are individually present un-muted in the audio field;

a collapsed state in which the member sound sources are muted and a collection-representing sound source provides an audible presence for the collection in the audio field; and

for causing sound sources that are un-related to said collection to remain present in the audio field independently of the collection state.

45. (New) The apparatus of claim 44 in combination with sound sources connected to the apparatus for deriving the audio field.

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